REGION 9
SAN FRANCISCO, CA 94105

October 15, 2024

Via email only

Department of the Navy
Naval Facilities Engineering Systems Command Southwest
Base Realignment and Closure
Program Management Office West
Attn: Michael Pound, BEC
33000 Nixie Way, Bldg 50, Second Floor
San Diego, CA 92147
michael.j.pound.civ@us.navy.mil

Re: U.S. EPA approval of the Navy's *Final Technical Memorandum: Strontium Analysis, Parcel G, Former Hunters Point Naval Shipyard, San Francisco, CA,* September *2024*

Dear Mr. Pound:

The U.S. Environmental Protection Agency ("EPA"), Region 9 is providing our approval of the U.S. Navy's *Final Technical Memorandum: Strontium Analysis ("Strontium Verification Study Report"), Parcel G, Former Hunters Point Naval Shipyard, San Francisco, CA, September 2024*. EPA submitted a comment letter with attachments on the revised draft report July 15, 2024. While EPA does not see the need for an amended final report, I am submitting several technical comments from our National Analytical Radiation Environmental Laboratory (NAREL) for the record (attachment).

EPA appreciates the Navy's efforts to work with the Federal Facility Agreement (FFA) Regulatory Parties through a series of focused meetings on the Parcel G, Strontium-90 analytical issues, including plans for the Strontium Verification Study Report / Field Change Request (aka FCR-008). Key to reaching consensus is a clear understanding and agreement among the FFA Parties about the approach, reflected by the Strontium Verification Study Report on the path forward regarding Phase 2 work.

EPA's review focused on the study design framework and results, though not the additional background discussion contained therein. EPA strongly recommends that the Navy develop a documented process to closely monitor laboratory results as they are generated to allow for a timely identification of non-compliance with the project's analytical requirements. Additionally, EPA recommends that the Navy develop a data validation plan (or Standard Operating

Procedure) with validation tests and criteria suitable for radiological data which at a minimum incorporates an evaluation of the reported measurement uncertainties as part of the validation criteria.

We are reiterating our offer to assist with review the data validation tests and criteria used if you would like for us to do so. NAREL recommends the use of *American National Standard (ANS)/American Nuclear Society (ANSI)-41.5, Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation* or the Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual, Chapter 8 Radiochemical Data Verification and Validation for the validation of radiological data.

If you have any questions regarding our response, please feel free to contact me at (415) 972-3167.

Sincerely,

Digitally signed by ANDREW BAIN
Date: 2024.10.15 15:43:55 -07'00'

Andrew Bain
EPA Region 9
Lead Remedial Project Manager
Northern California Federal Facilities Section
Superfund Division

Attachment: NAREL comments

cc with attachment:
Daniel Dutra, Navy
Brian Londquist, Navy
Michael Howley, DTSC
Dr. Terry Han, CDPH
Dr. Yuksel Ufuktepe, CDPH
Dr. John Griggs, EPA, NAREL

Enclosure: EPA National Analytical Radiation Environmental Laboratory (NAREL) Comments

General Comment:

The words "potential" and "potentially" have been inserted at many places in the document, in most cases incorrectly from the perspective of the science of measurements (metrology). The usage of these terms in most instances of the memo represents a fundamental misunderstanding between a *measured result* and the *unknown true value* of some quantity or property. One example is from 3.1.1: "…results potentially exceeding the Parcel G SR-90 RG…." Whenever the facts are known, like in the case of a measured result, the word "potentially" doesn't apply, and it is in fact nonsensical to state that any measured value *potentially* exceeds or *potentially* does not exceed an action level. The *unknown true* Sr-90 concentration can potentially exceed the RG, but a measured result either exceeds the RM or it doesn't. NAREL recommends removing all of these recently inserted occurrences of the term "potential" and "potentially," or a less desirable option would involve carefully examining each one to determine whether it is appropriate in context—i.e., whether it really refers to something that is unknown, like the unknown true concentration of Sr-90.

Specific Comments:

1. **Executive Summary**

a. The statement that "the Eichrom method for Sr-90 analysis passed the MARLAP-style verification study only when a method blank population correction subtraction is applied to the results" is not true, and conflicts with the statement in 4.1.2 that all the results passed *except one*. The MARLAP criteria require that all results pass. If one fails, the method fails. In fact, section 4.1.2 is contradictory in saying in one place that all results passed except one and later saying that the method meets MARLAP requirements.

b. Summary of Parcel G Strontium Data

The memo notes (under the subheading "Background") that according to ATSDR, "Sr-90 is found in nearly all soils in the United States, resulting in varying levels of anthropogenic background." Yet the following statement is made later in the context of unexpected results that exceeded the RG: "Sr-90 was detected in soil samples collected from trenches that were backfilled entirely with clean, sampled material from an off-site source." Given that Sr-90 is known to be present in nearly all soil samples, NAREL recommends that the second quoted statement be deleted or clarified unless there is an explanation of what was done to confirm that the soil was "clean"; otherwise, the detection of Sr-90 would not necessarily cast doubt on the adequacy of the method. Perhaps, "detected" in this case meant "measured above the RG" and "clean" meant "assumed to be well below the RG." If so, the sentence should be reworded to say that.

NAREL recommends changing the statement "The laboratory *determined* there was an interference" to "The laboratory *concluded* there was an interference." A similar change is suggested for Section 3.0. The lab's conclusion is plausible, but it hasn't been proved.

The explanation of the interference in the Eichrom Sr-90 method incorrectly states that the separation step is not part of the Eichrom TBS analysis. The explanation in 3.0 is more accurate.

c. Conclusions

The memo states: "Based on the results of the aforementioned studies, and with the agreement of the regulatory agencies, the Navy HPNS Team will analyze project samples for TBS using the Eichrom method (or equivalent method) for HPNS projects where Sr-90 is a radionuclide of concern." If a decision is made to use an "equivalent method" to analyze for Sr-90, the equivalence should be demonstrated. NAREL recommends that a MARLAP-style method validation be performed *before* using the method to analyze project samples.

2. **Section 2.4.3**

The TPU calculations are taken from the lab's SOPs. The memo should make that fact clear. The equations are not universal and do not necessarily reflect what other labs would or should do.

NAREL recommends deleting the parenthetical "(fractional decay factor in the denominator increases the uncertainty/detection limit)." It isn't wrong, but its meaning won't be clear to many readers, especially since a denominator appears nowhere in the equations as written.

3. **Section 3.0**

NAREL suggests changing the word "determined" to "concluded" in the sentence: "FCR-007 was issued because the laboratory ~~determined~~ "concluded" the Eichrom method produced Sr-90 results that were consistently biased high due to interference from lead-210 (Pb-210) …." To NAREL's knowledge, the conclusion, although plausible, was never proved.

4. **Section 3.1.1**

Third paragraph. NAREL suggests changing "Immediately, within the first few batches" to "Within the first few batches."

The fourth paragraph begins with "Upon receiving the first results potentially exceeding the Parcel G SR-90 RG…." While the unknown true Sr-90 activity might potentially exceed the RG, individual results either exceed it or they don't. The word "potentially" doesn't apply here. NAREL recommends deleting it as discussed in the first paragraph of NAREL's comments.

5. **Section 3.1.2**

The technical content of the last sentence is questionable and not particularly clear. NAREL recommends: "The high uncertainty in the isotopic Sr-90 analysis indicates a potential for high decision error rates."

6. **Section 3.1.3**

The statement that "method blank samples consist of DI water and do not contain radionuclides" is not true. Radionuclides are everywhere and can't be completely eliminated

even from DI water. NAREL recommends: “Method blank samples consist of DI water and are not expected to contain detectable Sr-90.”

7. **Section 3.2.1**

Last sentence of the second paragraph. NAREL recommends changing “beta emitters caused a high bias” to “beta emitters *likely* caused a high bias.”

8. **Section 4.2**

There’s very little information about the results. The section references Appendix D, which is empty.

9. **Section 5**

The memo still uses the incorrect symbol μ_{MR} for required method uncertainty. NAREL recommends using the correct symbol, u_{MR}.

EPA did not request that the lab calculate TPUs and compare them to the required method uncertainty. The lab did so, and EPA accepted the results, but NAREL had requested that the lab calculate method uncertainties in the *a priori* manner described by MARLAP. Such calculations do involve analyzing samples.

10. **Section 6.2**

NAREL recommends rewording the second bullet item. A strontium isotope is either beta-emitting or not beta-emitting. It isn’t “potentially” beta-emitting. Consider the following:

- TBS potentially includes other beta-emitting strontium isotopes….